Math 3C Final Study Guide

December 5, 2014

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General Information: The final exam will be held Wednesday, December 17 from 3 to 6pm in Solis 104 (the room where we typically have lecture NOT THE ONE IN CENTER HALL). The final will be cumulative, with emphasis on material that you have not been tested on yet (section 9.1 to the end) There will be 12 or 13 free response questions so about twice as long as a midterm. To receive full credit, show all your work or explain your reasoning. Even if you get an answer wrong, you can still get a significant amount of partial credit if you have good reasoning or a correct setup. You are required to bring a Blue Book, which is where you will work out your answers. You are allowed to bring with you 1 sheet of handwritten notes. No calculators or electronic devices will be permitted.

The following is a summary of each section from 9.1 on. See the study guides for Midterms 1 and 2 for summaries of the previous sections. It is not intended to be an exhaustive list of everything that could possibly be on the test, but is a guide to help you focus your study on the most relevant material.

9.1
Be familiar with:

- What the unit circle is and the equation for it.

- Finding specific points on the unit circle given some information.

- Angles on the unit circle, including negative angles and angles of more than $360°$.

- Know all the special points on the unit circle discussed in this section, as well as the angles they correspond to.

- Arc length on a circle.

Suggested practice problems: 1-6, 7-14, 35-40, 41-46, 47-50.

9.2
Be familiar with:

- What radians are.

- Converting between radians and degrees.

- Arc length and slice areas on circles.

Suggested practice problems: 1-16, 25-26, 31-33, 37-42.

9.3
   Be familiar with:

- The definitions of sine and cosine, and computing sin and cos for all the special angles on the unit circle.

- The Pythagorean relationship $\cos^2 \theta + \sin^2 \theta = 1$.

- The domain and range of the sin and cos functions.

- Be able to compute sin and cos of an angle by comparing to known angles on the unit circle

Suggested practice problems: 1-10, 21-24, 27-28.

9.4
   Be familiar with:

- The definition of tan, sec, csc, cot.

- Understand $\tan \theta$ as the slope of the radius of the unit circle and angle θ.

- The graph of the tangent function, including its domain and range.

Suggested practice problems: 9-18, 19-28, 29-36.

9.5
   Be familiar with:

- The right triangle characterization of sin, cos, and tan.

- Be able to compute the value of one trig function given the value of another.

Don't worry about: Getting decimal answers for angles that are not any of the special angles that we know (since you won't have a calculator)

Suggested practice problems: 1-28, 50-76.

9.6
   Be familiar with:

- All of the identities in boxes in this section. You don't necessarily have to memorize them if you understand the concept behind them to figure them out.

Suggested practice problems: 5-38, 39-66.

10.1
Be familiar with:

- The definitions of the inverse trig functions, $\cos^{-1}$, $\sin^{-1}$, and $\tan^{-1}$, especially where the domain needs to be restricted.

- The domain and range of all the inverse trig functions.

- Be sure you understand the distinction between $\cos^{-1} x$ and $(\cos x)^{-1}$.

Suggested practice problems: 1-4, 17-38 (on questions where you would need a calculator to get a decimal answer, just leave your answer unsimplified, such as $\sin^{-1}(.2)$.)

10.2
Be familiar with:

- Compositions of trig functions with inverse functions.

- Be especially careful that an inverse trig function needs to output something in its range.

- The identities for inverse trig functions involving $-t$.

Don't worry about: The other identities in this section, aside from the ones involving $-t$. The important thing in this section is the compositions.

Suggested practice problems: 1-18, 25-34.

11.2
Be familiar with:

- All the function transformations as applied to trig functions.

- The definition of amplitude, period, phase shift

Suggested practice problems: 1-14, 15-18, 25-52, 57-64.

General Tips:

- Try to avoid the common algebra errors that really annoy math teachers (remember $(a+b)^2 \neq a^2 + b^2$, remember to distribute $-$ signs, etc.).

- Try to check your work as much as possible, and think about if your answer is reasonable. Often you can plug your answer back in to the question to see if it satisfies what it is supposed to.

- Don't necessarily expect your answers to all come out as nice numbers. If you get something like $\frac{2+\sqrt{5}}{3}$, just leave it like that.

- In general, it is good practice to simplify answers as much as possible, but if you are feeling pressed for time, just leave an answer unsimplified, and come back and simplify it later if there is time.

- Be calm and confident. If you have mastered the homework, then you know what you are doing.